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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/615,956	07/10/2003	Byung-Kyu Lee	030681-529	1062
21839	7590	09/19/2005	EXAMINER	
BUCHANAN INGERSOLL PC (INCLUDING BURNS, DOANE, SWECKER & MATHIS) POST OFFICE BOX 1404 ALEXANDRIA, VA 22313-1404			BERNATZ, KEVIN M	
			ART UNIT	PAPER NUMBER
			1773	

DATE MAILED: 09/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.



## Office Action Summary

Application No.

10/615,956

Applicant(s)

LEE ET AL.

Examiner

Kevin M. Bernatz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1, 13 and 18-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 13 and 18-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 5/12/05.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.



## **DETAILED ACTION**

### ***Response to Amendment***

1. Amendments to claims 1 and 31 and cancellation of claims 2 – 12, 14 – 17 and 32, filed on July 5, 2005, have been entered in the above-identified application.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:  

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claim 18 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 18 recites a broad range (i.e. a genus) and a narrow range (i.e. species that fall under the genus) in the same claim and is indefinite for the reasons of record as set forth in Paragraph No. 5 of the Office Action mailed on February 2, 2005.

### ***Claim Rejections - 35 USC § 102***

5. Claims 1, 13, 18 – 20 and 28 – 31 are rejected under 35 U.S.C. 102(a), (b) and/or (e) as being anticipated by Kikitsu et al. (U.S. Patent App. No. 2001/0051287 A1)



for the reasons of record as set forth in Paragraph No. 7 of the Office Action mailed on February 2, 2005.

Regarding the amended language of first and second perpendicular magnetic recording layers have "crystalline structures and the first perpendicular magnetic recording layer has smaller crystalline grains and lower perpendicular magnetic anisotropic energy ( $K_u$ ) than the second perpendicular magnetic recording layer", the Examiner notes that the Kikitsu et al. teach forming the recording layer with a higher  $K_u$  than the functional layer (i.e. magnetic underlayer) (*Paragraph 0219 and examples*). Furthermore, the Examiner notes that many of the examples of Kikitsu et al. appear to inherently possess the claimed limitations of both layers being "crystalline structures" with one having smaller grain sizes than the other and the layer with the smaller grain size appearing to possess a smaller  $K_u$  (*examples, especially example 13*). Applicants are reminded that a single embodiment exhibiting the claimed limitations is a *prima facie* case of anticipation and the Examiner is entitled to reject claims on the basis of inherency where there is *sound basis* for the claimed limitations being inherent. Taking example 13 as merely one example, the Examiner's sound basis for the position of inherency is that the two alloys ( $\text{CoCrPt-SiO}_2$  and  $\text{CoCrTa}$ ) are both taught to be perpendicular, crystalline magnetic alloys wherein the  $\text{CoCrPt-SiO}_2$  layer has a grain diameter of 10 nm and a  $K_u$  of  $3 \times 10^7$  erg/cc (*Paragraphs 0316 and 0317*) and the  $\text{CoCrTa}$  layer is taught to have a  $K_u$  of  $6 \times 10^5$  erg/cc and similar  $\text{CoCrTa}$  alloys are shown to possess a grain size of 8 nm (*Paragraphs 0313 and 0316*). As such, the Examiner deems there is sufficient *sound basis* for the position that the disclosed



Co<sub>77</sub>Cr<sub>20</sub>Ta<sub>3</sub> alloy formed as described in example 13 to possess a measured Ku of  $6 \times 10^5$  erg/cc would inherently possess a crystal grain size smaller than that of the CoCrPt-SiO<sub>2</sub> recording layer.

Regarding claim 31, since the two layers in example 13 are crystalline magnetic layers formed on top of each other, the Examiner deems that they inherently possess lattice structures that match, especially since the Examiner notes that both Co-based alloys disclosed are known in the art as hexagonal close packed (hcp) alloys.

***Claim Rejections - 35 USC § 103***

6. Claims 1, 13, 18 – 20 and 22 – 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikitsu et al. as applied above.

Kikitsu et al. is relied upon as described above.

Regarding claims 1, 13, 18 – 20 and 28 – 31, while the Examiner maintains that at least one example appears to inherently meet the claimed limitations, the Examiner acknowledges that Kikitsu et al. fails to explicitly teach both controlling the grain size and Ku of one layer to be lower than the grain size and Ku of the other magnetic layer.

However, Kikitsu et al. does teach controlling the Ku of the recording layer to be greater than the Ku of the magnetic functional layer underneath the recording layer (*Paragraph 0219*). Kikitsu et al. further teach a perpendicular magnetic base layer (which the Examiner notes is identical in being beneath the perpendicular magnetic recording layer) possessing a Ku that can be smaller or larger than the Ku of the recording layer, depending on the temperature of measurement (*Figures 6 and 7 and*



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*relevant disclosure thereto*). Kikitsu et al. further teach embodiments wherein the grain size of the base layer is either less than or greater than the grain size of the recording layer (*examples 1 – 7*). The Examiner notes that in embodiments possessing no (or a non-magnetic) switching layer Figure 6 would lead one of ordinary skill in the art to produce a base layer possessing a higher Ku than the recording layer, when measured at room temperature. In addition, the examples disclosing embodiments possessing no (or a non-magnetic) switching layer (*examples 1 – 6*), only the embodiment teaching a superparamagnetic base layer (*example 5*) possesses a base layer with a smaller grain size than the recording layer. I.e. for an embodiment possessing no (or a non-magnetic) switching layer, Figure 6 teaches a base layer (i.e. applicants' "first perpendicular magnetic recording layer") having a higher Ku than the recording layer (i.e. applicants' "second perpendicular magnetic recording layer") and the examples teach a base layer (*first perpendicular magnetic recording layer*) having a larger grain size than the recording layer (*second perpendicular magnetic recording layer*).

It would therefore have been obvious to one of ordinary skill in the art at the time of the applicant(s) invention to modify the device of Kikitsu et al. to meet the claimed relative Ku and grain size limitations as taught by Kikitsu et al. since Kikitsu et al. teach each limitation individually for embodiments possessing no (or a non-magnetic) switching layer.

Regarding claims 22 – 27, Kikitsu et al. is relied upon for the reasons of record as set forth in Paragraph No. 12 of the Office Action mailed on February 2, 2005.



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7. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kikitsu et al. as applied above in Paragraphs 5 and 6, and further in view of Takahashi et al. (U.S. Patent No. 6,709,768 B2) for the reasons of record as set forth in Paragraph No. 13 of the Office Action mailed on February 2, 2005.

***Response to Arguments***

**8. The rejection of claims 1, 13, 19, 20, 29 - 31 under 35 U.S.C § 112 – 1<sup>st</sup> Paragraph**

The above noted rejection has been withdrawn because applicant(s) amendment(s) have set forth new limitations (e.g. amended claim 1) overcoming the above noted rejection.

**9. The rejection of claims 1, 13 and 17 - 31 under 35 U.S.C § 112 – 2<sup>nd</sup> Paragraph**

The above noted rejection, with the exception of claim 18, has been withdrawn because applicant(s) amendment(s) have set forth new limitations (e.g. amended claim 1) overcoming the above noted rejection.

**10. The rejection of claims 1, 13 and 18 - 31 under 35 U.S.C § 102(a), (b) and/or (e) and/or 103(a) – Kikitsu et al., alone or in combination with Takahashi et al.**

Applicant(s) arguments have been considered but are moot in view of the new ground(s) of rejection. The Examiner notes that applicants' arguments have been



addressed in the treatment of the new limitations to claim 1 in Paragraphs 5 and 6, above.

**11. The rejection of claims 1, 2, 8 – 10, 13, 17 – 31 under 35 U.S.C § 102(a) and/or (e) and/or 103(a) – Ikeda et al., alone or in combination with various references**

The above noted rejection has been withdrawn because applicant(s) amendment(s) have set forth new limitations (e.g. amendment to claim 1) no longer anticipated, nor rendered obvious, by the above noted rejection.

***Conclusion***

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of



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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

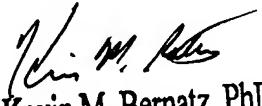
Applicants' amendment resulted in embodiments not previously considered (i.e. amended language of claim 1) which necessitated the new grounds of rejection, and hence the finality of this action.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin M Bernatz whose telephone number is (571) 272-1505. The examiner can normally be reached on M-F, 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on (571) 272-1284. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KMB  
September 9, 2005

  
Kevin M. Bernatz, PhD  
Primary Examiner